

## ABSTRACT

A method for characterizing fluorescent molecules or other particles in samples comprising the steps of:

- a) monitoring fluctuating intensity of fluorescence emitted by the molecules or other particles in at least one measurement volume of a non-uniform spatial brightness profile by measuring numbers of photon counts in primary time intervals by a single or more photon detectors,
- b) determining at least one distribution of numbers of photon counts,  $\hat{P}(\mathbf{n})$ , from the measured numbers of photon counts,
- c) determining physical quantities characteristic to said particles by fitting the distribution of numbers of photon counts  $\hat{P}(\mathbf{n})$ ,

wherein the fitting procedure involves calculation of a theoretical distribution function of the number of photon counts  $P(\mathbf{n})$  through its generating function, defined as

$$G(\vec{\xi}) = \sum_n \vec{\xi}^n P(\mathbf{n}).$$